CLAIMS

What is claimed is:

1. A method for managing an adaptive broadcast channel in a network having nodes communicating via scheduled time slots on a time multiplex basis, comprising the steps of:

establishing a broadcast schedule having a plurality of transmit broadcast slots;

associating at least one standby communication slot with at least one transmit broadcast slot of the broadcast schedule;

assigning a specific transmit broadcast slot to a specific node of the network, the specific node being then permitted to transmit a broadcast message during the specific transmit broadcast slot; and

designating at least one of the standby communication slots associated with the specific transmit broadcast slot to be used by the specific node for reception of communications, wherein another node of the network may use the at least one designated standby communication slot to transmit to the specific node.

2. The method of claim 1, further comprising the step of indicating the status of the designated standby communication slot.

3. The method of claim 2, wherein said indicating step signals whether the designated standby communication slot is currently being used to receive a communication.

4. The method of claim 2, wherein said indicating step signals whether a transmission conflict exists in the designated standby communication slot.

5. The method of claim 1, further comprising the step of relating a specific neighbor node with at least one of the designated standby communication slots, wherein the specific neighbor node can use the at least one related designated standby communication slot to transmit to the specific node.

6. The method of claim 5, further comprising the step of transmitting in the related designated standby communication slot when it is not being used for communication by the specific node or the specific neighbor node related thereto, the transmission being performed without prior reservation, and the transmission being performed by a transmitting node other than the specific neighbor node related to the designated standby communication slot.

7. The method of claim 5, further comprising the step of explicitly reserving, by a transmitting node other than the specific neighbor node, at least one of the designated standby communication slots related to the specific neighbor node, the at least one explicitly reserved standby communication slot not being currently used for communication by the specific neighbor node, and

wherein the transmitting node reserves the at least one explicitly reserved standby communication slot in order to transmit to the specific node.

8. The method of claim 1, wherein said establishing step further comprises the step of optimizing the broadcast schedule to prevent collisions in the at least one standby communication slot by scheduling unique time slot and channel combinations that are keyed to the transmit broadcast slot assigned to each neighbor of the specific node.

9. The method of claim 8, wherein said optimizing step further comprises the step of determining how many channels and time slots are required to handle an expected maximum number of simultaneous transmissions in the network.

10. The method of claim 9, wherein said determining step comprises the step of calculating how many communication channels are required by solving C = N/2, and calculating how many communication slots are required by solving S = 2(N - 1), where C represents the number of channels being determined, S represents the number of communication slots being determined, and N represents the number of nodes in the neighborhood of the receiving nodes.

11. The method according to claim 5, further comprising the step of optimizing the broadcast schedule in a manner such that when a node is determining whether to transmit in a designated standby communication slot

related to another node, the available options will carry a substantially equal probability of blocking the node's own opportunity to transmit and of blocking its own opportunity to receive.

12. The method of claim 9, wherein the required number of channels is a known constant, and wherein said determining step comprises the step of calculating the required number of communication slots according to:

$$S \equiv \frac{N(N-1)}{C}$$

where C represents the fixed number of channels, S represents the number of communication slots being determined, and N represents the number of nodes in the neighborhood of the receiving nodes.

13. A communication apparatus capable of participating in a network having nodes communicating via scheduled communication slots on a time multiplex basis, comprising:

a wireless communication component;

a memory component, storing a communication schedule of a plurality of transmit broadcast slots, storing data associating at least one standby communication slot with at least one transmit broadcast slot of the plurality of transmit broadcast slots, storing data assigning a specific transmit broadcast slot of the plurality of transmit broadcast slots to the communication apparatus, and storing data indicating at least one of the standby communication slots associated with the specific transmit broadcast slot for reception of communications by the communication apparatus, said memory component also storing instructions for dynamically managing the communication schedule, and for receiving and transmitting data via said wireless communication component; and

a processor component, coupled with said wireless communication component and with said memory component, capable of executing the instructions for dynamically managing the broadcast schedule and capable of executing the instructions for receiving and transmitting data via said wireless communication component.

14. The communication apparatus according to claim 13, wherein said memory component also stores instructions for indicating whether the at least one indicated standby communication slot is currently being used to receive a communication; and wherein said processor component is capable of executing the instructions for indicating whether the at least one indicated standby communication slot is currently being used to receive a communication.

15. The communication apparatus according to claim 13, wherein said memory component also stores instructions for indicating whether a transmission conflict exists in the at least one indicated standby communication slot; and wherein said processor component is capable of executing the instructions for indicating whether a transmission conflict exists in the at least one indicated standby communication slot.

16. The communication apparatus according to claim 13, wherein said memory component also stores data relating a specific neighbor node with at least one indicated standby communication slot, thereby indicating that the related specific neighbor node can use the at least one indicated standby communication slot to transmit to the specific node.

17. The communication apparatus according to claim 16, wherein said memory component stores instructions enabling communications initiated pursuant to an implicit reservation of an unused indicated standby communication slot to be received by the communication apparatus, and wherein

said processor component is capable of executing the instructions enabling reception of communications initiated pursuant to an implicit reservation.

18. The communication apparatus according to claim 16, wherein said memory component stores instructions enabling communications initiated pursuant to an explicit reservation of an unused indicated standby communication slot to be received by the communication apparatus, and wherein said processor component is capable of executing the instructions enabling reception of communications initiated pursuant to an explicit reservation.

19. The communication apparatus according to claim 16, wherein said memory component stores instructions for optimizing the broadcast schedule to prevent collisions in the at least one standby communication slot by scheduling unique time slot and channel combinations that are keyed to the transmit broadcast slot assigned to each neighbor of the specific node, wherein said memory component also stores data indicating the unique time slot and channel combinations scheduled, and wherein said processor component is capable of executing the instructions for optimizing the broadcast schedule to prevent collisions in the at least one standby communication slot.

20. A communication apparatus capable of participating in a network having nodes communicating via scheduled communication slots on a time multiplex basis, comprising:

means for wireless communication;

means for storing information, storing a communication schedule of a plurality of transmit broadcast slots, storing data associating at least one standby communication slot with at least one transmit broadcast slot of the plurality of transmit broadcast slots, storing data assigning a specific transmit broadcast slot of the plurality of transmit broadcast slots to the communication apparatus, and storing data indicating at least one of the standby communication slots associated with the specific transmit broadcast slot for reception of communications by the communication apparatus, said means for storing information also storing instructions for dynamically managing the communication schedule, and for receiving and transmitting data via said wireless communication component; and

means for processing data, coupled with said means for wireless communication and with said means for storing information, executing the instructions for dynamically managing the broadcast schedule and executing the instructions for receiving and transmitting data via said wireless communication component.